Figure 4 is a schematic perspective of a high frequency imaging system incorporating a two-dimensional nonlinear dual-frequency focal plane antenna according to one embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

5　　　　The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and

10　　complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements throughout.

　　　　Electromagnetic radiation in the RF (radio frequency), microwave, millimeter and optical wave ranges interacts with thin conducting bodies, such as wires when the conductor is aligned with the electric field of radiation. The interaction is dependent

15　　upon conductor electrical length length, l, in relation to the radiation wavelength, λ. A half wavelength dipole antenna, for example, will resonate and reradiate for a conductor electrical length that is one half the radiation wavelength. For any such antenna, the antenna converts the electromagnetic wave to an induced voltage and current. The intermodulation function of the diode converts the two frequencies to

20　　their sum and difference frequencies. Dipole antennas and nonlinear resonant circuits placed in the intersection of beams as elements of the two-dimensional array can be employed to reradiate primarily the difference frequency. One way of doing that is to tune the resonant circuits to selectively resonate the difference frequency.

　　　　A dual-frequency antenna is described in co-pending U.S. Patent Application

25　　Nos. 10/780 525 entitled "Dual-Frequency Antenna And Associated Down-Conversion Method"; 10/780,520 entitled "Two-Dimensional Dual-Frequency Antenna And Associated Down-Conversion Method"; and 10/780, 536 entitled "High-Frequency Two-Dimensional Antenna And Associated Down-Conversion Method," all of which are filed concurrently herewith, and all of which

30　　are incorporated herein by reference in their entirety. A dual-frequency antenna comprises of a "string of dipoles" that are lined up in a line. These individual dipoles are connected at their ends with the matching resonant circuits. These circuits include a nonlinear element, such as a diode. In accordance with their purpose, the dual-